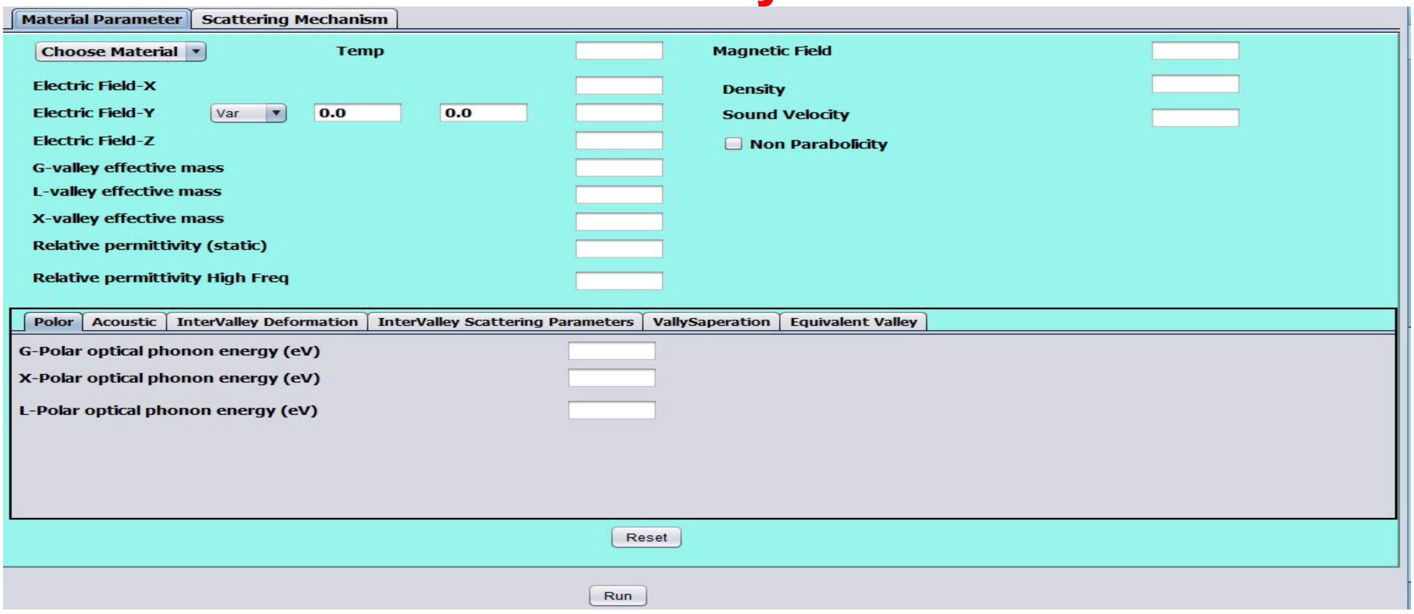
Electron Mobility Simulator



Introduction

Electron Mobility Simulator is powerful tool to simulate carriers transport at few valleys or on full energy band structure. The microscopic simulation of the motion of individual particles in the presence of the forces acting on them due to external fields as well as the internal fields of the crystal lattice and other charges in the system. In solids, such as semiconductors and metals, transport is dominated by random scattering events due to impurities, lattice vibrations, etc, which randomize the momentum and energy of charge particles in time. Hence, stochastic techniques to model these random scattering events are particularly useful in describing transport in semiconductors, in particular the Monte Carlo method. Provides flexibility to users to initialize the carriers over full energy band and analyze the transport of carrier through simulation of the ensemble velocity associated with each and every carriers under external electromagnetic forces, similar to Hall experiment. The physics included in TNL-EM (Electron Mobility) simulator which is reliable and capable to simulate the electronic transport in semiconductor materials and predict the carrier mobility. TNL-EM (Electron Mobility) simulator uses the Monte Carlo technique which improves the "state-of-the-art" treatment of high-energy carrier dynamics.

Features

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- Boltzmann transport equation solution
- Ensemble Monte Carlo Technique
- Include standard scattering mechanisms
- Fermi Golden Rule for momentum & energy conservation
- Modeled beyond the effective-mass approximation on the full electronic band structure obtained from Full Energy Band Simulator.
- The electron-phonon, electron-impurity, and electron-electron scattering rates included in a way consistent with the full band structure of the solid
- Thus accounting for density-of-states and matrix-element effects more accurately.
- The carrier transport on the full energy band under influence of electro-magnetic forces is traceable for each single carrier.

Benefits

- Binary and ternary database
- Users input electric & magnetic field
- Carrier transport on Full Electronic Energy Band
- Extraction of Velocity of carriers under external forces
- Input database for initial parameters
- Transport on Parabolic & Nonparabolic energy bands
- Different Scattering
- Ability to deal with different cubic, Zincblende & Wurtzite alloys
- Effect of different scattering mechanisms on Carrier's transport

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